CLAIMS

1. A system (1) for damping thermo-acoustic instability in a combustor device (2) for a gas turbine, the combustor device comprising at least one combustion chamber (4) and at least one burner (7) associated to said combustion chamber and mounted in a position corresponding to a front portion set upstream (8) of the combustion chamber; the damping system comprising at least one Helmholtz resonator (12), in turn comprising a casing (13) defining inside it a pre-set volume (14) and a neck (15) for hydraulic connection between said pre-set volume (14) and said combustion chamber (4); said system being **characterized in that** said neck (15) is connected to one side of said combustion chamber (4) distant from said front upstream portion (8) thereof provided with said at least one burner (7).

2. The system (1) for damping thermo-acoustic instability according to Claim 1, characterized in that said combustion chamber (4) is of an annular type, said at least one resonator (12) being set in a circumferential position about said combustion chamber, housed within an air case (16) for delivery of air for supporting combustion set outside an annular body (10) delimiting said combustion chamber.

3. The system (1) for damping thermo-acoustic instability according to Claim 2, characterized in that said casing (13) of the resonator comprises means (18) for delivery of a cooling fluid.

4. The system (1) for damping thermo-acoustic instability according to Claim 3, characterized in that said means for delivery of a cooling fluid consist of a plurality of holes (18) of a pre-set diameter made

through the casing (13) of the resonator and designed to enable passage of part of said air for supporting combustion towards said combustion chamber (4) directly through said pre-set volume and said neck of the resonator (12).

5. The system (1) for damping thermo-acoustic instability according to Claim 4, characterized in that said holes are made only through an end plate (20) of said casing of the resonator, facing the side opposite to said combustion chamber (4), and are arranged in positions asymmetrical to one another.

6. The system (1) for damping thermo-acoustic instability according to any one of Claims 2 to 5, characterized in that said casing (13) of the resonator comprises means for selectively varying said pre-set volume (14) within a pre-set range.

7. The system (1) for damping thermo-acoustic instability according to Claim 6, characterized in that said casing (13) of the resonator comprises two cup-shaped tubular bodies (21, 22), which are mounted in a telescopic way co-axially on one another, with respective concavities facing one another, by means of a threaded coupling (23); and a threaded fixing ring-nut (24), which is coupled outside on one first (22) of said cup-shaped tubular bodies provided, in a single piece, with said neck (15) and is designed to bear axially upon one second (21) of said cup-shaped tubular bodies, screwed outside on the former one on the side opposite to said combustion chamber.

8. The system (1) for damping thermo-acoustic instability according to any one of Claims 2 to 7, characterized in that said casing (13) and said neck

(15) of said at least one resonator have a cylindrical symmetry and are arranged with respective axes of symmetry (B) thereof parallel to one another and oriented to form a pre-set angle with a direction of flow (6) of burnt gases that traverse said combustion chamber.

9. The system (1) for damping thermo-acoustic instability according to Claim 8, characterized in that said pre-set angle is substantially of 90°.

10. The system (1) for damping thermo-acoustic instability according to either Claim 8 or Claim 9, characterized in that it comprises more than one of said Helmholtz resonators (12), said combustor comprising more than one of said burners (7); said resonators (12) being mounted circumferentially in a ring, in cantilever fashion on said annular body (10) delimiting said combustion chamber (4), in positions asymmetrical with respect to one another, both in a radial direction and in the axial direction with reference to an axis of symmetry (A) of said annular combustion chamber, and with the respective necks (15) hydraulically connected to a downstream portion (5) of said combustion chamber.